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PROW and IWHLDA present the GUIDE on:

CD34

Authors: H. Nishio; J. Tada; N. Hashiyama; J. Hirn; J. Ingles-Esteven; Toshio Suda
Reviewers: Curt I. Civin; Mary Jo Fackler

Link to additional info in FORUM

FUNCTION | STRUCTURE | INTERACTIONS | EXPRESSION | INSIGHTS | REAGENTS | REFERENCES | WWW

COMMENT ALTERNATE NAMES FOR CD34

- CD34 [HUGO gene name]
- gp105-120

COMMENT MAJOR LINKS FOR CD34

- NCBI LocusLink Record: 947
- Mendelian Inheritance in Man (OMIM): 142230
- SwissProt annotated protein record: P28906

FUNCTION

COMMENT BIOCHEMICAL ACTIVITY OF CD34 - No information

COMMENT CELLULAR FUNCTION OF CD34 Link to additional info in FORUM

- Cell-cell adhesion
- Inhibition of hematopoietic differentiation?

COMMENT DISEASE RELEVANCE OF CD34 AND FUNCTION OF CD34 IN INTACT ANIMAL

- No abnormality in leukocyte trafficking was detected in the CD34 knock-out mice
- In 1 of 2 reports of CD34 knock-out mice, a decrease in hematopoietic progenitors was found in the knock-out mice
- Utilization of CD34 mAb to quantitate and purify lymphohematopoietic stem / progenitor cells for research and for clinical bone marrow transplantation

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STRUCTURE

COMMENT **MOLECULAR FAMILY FOR CD34**

- Families in which CD34 is a member
  - CD34-->sialomucin-->Mucins

COMMENT **MOLECULAR STRUCTURE OF CD34**

- A heavily glycosylated type I transmembrane protein. There are two forms of the CD34 protein, resulting from alternative splicing
- The complete extracellular region is present in both forms of CD34
- There is a cysteine-rich repeat (Ig-like domain) in the extracellular region
- The full-length form of CD34 molecule has an intracellular domain, which contains consensus sites for protein kinase C (PKC) phosphorylation, serine and threonine phosphorylation by other kinases, and tyrosine phosphorylation (To date, only serine phosphorylation by has been actually demonstrated)
- The truncated form of CD34 lacks most of the intracellular domain, including many of the potential phosphorylation sites

	Full-length form	Truncated form
Full amino sequence	385	328
Intracellular region	73	16
Transmembrane	23	23
Extracellular region	258	258
Signal sequence	31	31

COMMENT **MOLECULAR MASS OF CD34**

CELL TYPE	MW UNREDUCED	MW REDUCED	Comment
Various cells	116 kDa predicted 40 kDa deduced		Although 116 kDa is the molecular weight as estimated by mobility of the naturally occurring glycoprotein, note that molecular mobility of CD34 is strongly influenced by its charge, mainly due to glycosylation. In fact, the amino acid sequence deduced from the human CD34 gene sequence

			predicts a polypeptide of only 40kDa

COMMENT **POST-TRANSCRIPTIONAL MODIFICATION OF CD34**

- One species contains exons 1 through 8 and forms the full-length form of CD34
- An alternative splice variant results in the insertion of an additional exon (exon X, 194bp) between exon 7 and 8; this introduces a translational stop codon, which results in the truncated form of CD34 with a shorter cytoplasmic domain
- The transmembrane and extracellular regions of both forms of CD34 are identical

COMMENT **POST-TRANSLATIONAL MODIFICATION OF CD34**

- Beginning at the NH2 terminus, the extracellular domain is heavily N- and
- O-sialoglycosylated
- Serine phosphorylation of the intracellular domain has been demonstrated, and there are potential sites for serine, threonine, and tyrosine phosphorylation

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MOLECULAR INTERACTIONS

COMMENT **PROTEINS AND DNA ELEMENTS WHICH REGULATE TRANSCRIPTION OF CD34**

MOLECULE	COMMENT
myb	Potential physiologic activation of CD34 has been shown to occur in CD34+ glioblastoma cell lines
myc	c-myc is expressed in most proliferating cell types. The gene products play an essential role in normal cell growth and development
ets-2	Transcription factor can activate human CD34 transcription independently
mzf-1	Zinc finger protein that is up-regulated during myeloid differentiation, can bind to CD34 promotor
NC-3A	A multiprotein complex can positively regulate the human CD34 promotor via the TCATTT motif, which can act as an enhancer

COMMENT **SUBSTRATES FOR CD34** - No information

COMMENT **ENZYMES WHICH MODIFY CD34** - No information

COMMENT **LIGANDS FOR CD34 AND MOLECULES ASSOCIATED WITH CD34**

MOLECULE	COMMENT
L-selectin	L-selectin is the lymphocyte homing receptor and binds to both GLYCAM-1 and CD34 from high vein endothelial cells in lymph nodes. However, L-selectin does not appear to bind vascular CD34 outside of high endothelial venules or to hematopoietic CD34

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EXPRESSION

COMMENT **MAIN CELLULAR EXPRESSION OF CD34** Link to additional info in FORUM

- Expressed on early lymphohematopoietic stem and progenitor cells, small-vessel endothelial cells, embryonic fibroblasts, and some cells in fetal and adult nervous tissue
- Also, expressed on hematopoietic progenitors derived from fetal yolk sac, embryonic liver, and extra-hepatic embryonic tissues including aorta-associated hematopoietic progenitors in the 5 week human embryo

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COMMENT **AUTHOR'S ADDITIONAL INSIGHTS ON CD34** - No information

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REAGENTS

COMMENT **CD34-SPECIFIC MABS NEWLY ASSIGNED AT SIXTH INTERNATIONAL WORKSHOP**

NAME(Workshop IDs)	SOURCE or REFERENCE	COMMENT
ICO115 (MA2)	Bryshnikov	
B-G25 (MA9)	Clement	
B-H21 (MA10)	Clement	
NU4A1 (MA42)	Nakamura	
45.28 (MA46)	Reisbach	
Birma-K3 (MA6)	Broe	
B-F23 (MA8)	Clement	
6A6 (MA54)	Simmons	

7E10 (MA55)	Simmons	
4H11 (MA58)	Stockbauer	

COMMENT **SELECTION OF OTHER CD34-SPECIFIC REFERENCE MAB**

NAME(Workshop IDs)	SOURCE or REFERENCE	COMMENT
IMMU409	Hirn	
IMMU133	Hirn	
Qbend10	Jacob	
581	Gaudernack	
8G12	Warner	
My10	Lanier	

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COMMENT **SELECTED REFERENCES ON CD34**

REVIEWS

1. Krause DS,Fackler MJ,Civin CI,May WS CD34: structure, biology, and clinical utility. Blood 1996 87:1 PubMed

2. Sutherland DR,Keating A The CD34 antigen: structure, biology, and potential clinical applications. J Hematother 1992 1:115 PubMed

PRIMARY CITATIONS

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4. Civin CI,Strauss LC,Brovall C,Fackler MJ,Schwartz JF,Shaper JH Antigenic analysis of hematopoiesis. III. A hematopoietic progenitor cell surface antigen defined by a monoclonal antibody raised against KG- 1a cells. J Immunol 1984 133:157 PubMed

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differentiation of M1 cells. Blood 1995 85:3040 PubMed

6. Gaudernack, G. and Egeland, T. Leucocyte typing (ed.Schlossman, S.F. et al), pp. 861-4. Oxford University Press, Oxford (1995)

7. Huyhn A,Dommergues M,Izac B,Croisille L,Katz A,Vainchenker W,Coulombel L Characterization of hematopoietic progenitors from human yolk sacs and embryos. Blood 1995 86:4474 PubMed

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9. Nakamura Y,Komano H,Nakauchi H Two alternative forms of cDNA encoding CD34. Exp Hematol 1993 21:236 PubMed

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11. Sato N,Sawada K,Koizumi K,Tarumi T,Ieko M,Yasukouchi T,Yamaguchi M,Takahashi TA,Sekiguchi S,Koike T In vitro expansion of human peripheral blood CD34+ cells. Blood 1993 82:3600 PubMed

12. Satterthwaite AB,Burn TC,Le Beau MM,Tenen DG Structure of the gene encoding CD34, a human hematopoietic stem cell antigen. Genomics 1992 12:788 PubMed

13. Suda J,Sudo T,Ito M,Ohno N,Yamaguchi Y,Suda T Two types of murine CD34 mRNA generated by alternative splicing. Blood 1992 79:2288 PubMed

14. Sutherland DR,Abdullah KM,Cyopick P,Mellors A Cleavage of the cell-surface O-sialoglycoproteins CD34, CD43, CD44, and CD45 by a novel glycoprotease from Pasteurella haemolytica. J Immunol 1992 148:1458 PubMed

15. Tavian M,Coulombel L,Luton D,Clemente HS,Dieterlen-Lievre F,Peault B Aorta-associated CD34+ hematopoietic cells in the early human embryo. Blood 1996 87:67 PubMed

16. Tindle RW,Nichols RA,Chan L,Campana D,Catovsky D,Birnie GD A novel monoclonal antibody BI-3C5 recognises myeloblasts and non-B non- T lymphoblasts in acute leukaemias and CGL blast crises, and reacts with immature cells in normal bone marrow. Leuk Res 1985 9:1 PubMed

WWW RESOURCES

* indicates ammended by reviewer, ** indicates added by reviewer

Modified 10/14/99 prow@ncbi.nlm.nih.gov